

Station News

The Connecticut Agricultural Experiment Station
Volume 12 Issue 4 | April 2022



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The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and the nation. Seeking solutions across a variety of disciplines for the benefit of urban, suburban, and rural communities, Station scientists remain committed to "Putting Science to Work for Society", a motto as relevant today as it was at our founding in 1875.



CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

GRANTS RECEIVED MARCH 2022

ANDREA GLORIA-SORIA received the 2022 Experiment Station Associates Early Career Scientist award, \$8,000-\$10,000, funded by The CAES.

West Nile virus (WNV) is maintained by mosquitoes in the *Culex pipiens* complex and wild passerine birds. Some of these mosquitoes also play important roles in transmission to humans and equines, due to flexibility in host choice across the range of distribution. Differences in mosquito feeding habits may explain geographic variation in WNV transmission, as transmission can only result from a successful contact between a mosquito vector and a potential WNV reservoir host. Host choice by the members of the *Cx. pipiens* complex may be influenced by environmental factors and/or genetic differences among regional mosquito populations. By conducting a regional analysis of mosquito-host interactions and the underlying mosquito genomics we seek to better understand the drivers of host choice and guide the design of interventions aimed to stop WNV transmission cycle. Examples of such interventions include habitat modification to reduce risk and the identification of genetic pathways that can be targeted to disrupt or reduce mosquito blood feedings on human hosts.

DEPT. OF ENTOMOLOGY submitted a research proposal titled “Investigating Range Expansion, Infection Status, and Dynamics of Interaction between Native and Invasive Ticks and the Risk of Human and Veterinary Infection” for The CAES Board of Control Research Award. March 25, 2022.

ADMINISTRATION

DR. JASON C. WHITE participated in a National Nanotechnology Initiative webinar titled “What We Know About NanoEHS: Building International Bridges” (March 1); spoke with Prof. Vasilis Vasiliou of Yale University regarding collaborative research and jointly supervised PhD students (March 1); participated in the Northeast Regional Association of Agricultural Experiment Station Directors (NERA) Multistate Advisory Committee meeting (March 2); with **DR. SARA NASON** and **DR. NUBIA ZUVERZA-MENA**, participated in a Zoom meeting with collaborators at the University of Minnesota and Yale University to discuss progress on a joint NIEHS grant (March 2); participated in the NSF Center for Sustainable Nanotechnology (CSN) weekly All-Hands call (March 2, 9, 16, 23); participated in an NIH webinar regarding service on an upcoming Study Section (March 2); spoke with collaborators at Auburn University regarding a collaborative grant proposal (March 3); participated in a CT Department of Agriculture statewide call concerning Avian influenza response (March 3); met with representatives of ABSCIEX regarding installation of a new LC-MS instrument (March 3); held a Zoom call with Dr. Hongda Chen of the USDA National Institute for Food and Agriculture (NIFA) to discuss a joint publication for the National Academy of Engineering (March 4, 8); participated in the CAES Post-Doctoral Association-sponsored workshop on grant writing (March 4); participated in the monthly Laboratory Preparedness Advisory Committee Meeting via Teams (March 7); participated in the 5th annual Nanyang Technology University - Harvard T.H. Chan School of Public Health virtual symposium (March 8); with **DR. WADE ELMER**, **DR. CHRISTIAN DIMKPA**, and **DR. JAYA BORGATTA**, hosted a Zoom call with collaborators at Johns Hopkins University to discuss progress on a joint USDA research project (March 8, 29); hosted the monthly CSN Nanochem-Plant call (March 8); with **DR. SUSANNA KERIÖ** and **DR. QUAN ZENG**, participated in a Zoom call with collabo-

rators at SKUAST-Kashmir regarding collaborative research (March 11); hosted the quarterly CAES Safety Committee meeting (March 11); participated in the monthly FDA LFFM Zoom calls for the Food Defense and the Human and Animal Food Programs (March 14); attended the quarterly NERA business meeting and gave a presentation titled “Nanotechnology and Agriculture: Sustainably Achieving Food Security” (March 15); with **DR. NUBIA ZUVERZA-MENA**, spoke by Zoom with collaborators at the University of Texas El Paso regarding a joint USDA grant proposal (March 15); participated in the Search Committee meeting for a new scientist position in the Department of Plant Pathology and Ecology (March 16); spoke by Zoom with Hannah Brown of the University of Florida about her work at CAES this summer as a Yale Conservation Scholar (March 16); participated in the Farmland Preservation Advisory Board meeting (March 17); spoke by Zoom with collaborators at the University of Texas El Paso regarding collaborative research (March 21); participated in an FDA-sponsored LFFM Grants Management Webinar (March 22); spoke by Zoom with Lei Wang of South China Agricultural University regarding a potential research visit to The CAES (March 23); with **DR. NUBIA ZUVERZA-MENA**, spoke by Zoom with collaborators at Rutgers University regarding a joint USDA grant proposal (March 23); participated in an NIH Study Section by Zoom (March 24); participated in a Zoom meeting with collaborators at the University of Rhode Island regarding joint grant proposals (March 25); with **DR. NUBIA ZUVERZA-MENA**, **DR. SARA NASON**, and **DR. LEIGH WHITTINGHILL**, participated in a Zoom meeting regarding a potential phytoremediation project in Bridgeport (March 25); with multiple CAES staff members, participated in a Zoom call with New Haven Public School staff regarding a CAES Mentoring Girls in Science program (March 28); with **DR. CHRISTIAN DIMKPA** and other staff in the Department of Analytical Chemistry, participated in an FDA Zoom call to discuss a CAES presentation at an upcoming FDA LFFM meeting (March 28); with **DR. CHRISTIAN DIMKPA**, spoke by Zoom with Brian Scott-Smith about the next CAES podcast (March 29); gave a presentation by Zoom to the University of California Riverside Department of Botany and Plant Sciences titled “Nanotechnology in Agriculture: A Path to Sustainably Achieve Food Security?” (March 30); and spoke by phone with Dean Indrajeet Chaubey of the University of Connecticut College of Agriculture, Health, and Natural Resources about increased collaboration among staff (March 31).

ANALYTICAL CHEMISTRY

DEPARTMENT OF ANALYTICAL CHEMISTRY contributed to national food safety measures. The Department of Analytical Chemistry (DAC) of The CAES, working with food inspectors from the CT Department of Consumer Protection, recently analyzed imported fresh asparagus produce that revealed the presence of an insecticide, carbofuran, that is banned for use in the United States. This work resulted in the foreign processor of the produce being added to the “red list” attachment of FDA’s [Import Alert 99-05](#), *Detention Without Physical Examination of Raw Agricultural Products for Pesticides*. This is a significant accomplishment requiring sample analytical package from DAC to be reviewed by multiple regulators within the FDA.

Thanks to **DRS. CARLOS TAMEZ** and **WALTER KROL** for the excellent analytical work. Signed Chris Dimkpa, Department Head.

DR. CHRISTINA ROBB attended Executive Committee meetings of the Eastern Analytical Symposium (EAS) (March 7, 14, 21, 28); participated in the American

Public Health Laboratory (APHL) Food Chemistry Workgroup meeting (March 10); discussed the LEARN committee with Flanders Nature Center and Land Trust (March 9, 31); attended “Ion Mobility Mass Spec - A 4th Dimension Gets More Information Faster Than Ever Before” (March 10); met with FDA collaborators and LFFM management on the topic of select agent testing (March 16); attended Food Integrity online 2022 “Closer to Zero with Conrad Choiniere from the Office of Analytics and Outreach Director at the Department of Health and Human Services, FDA” and “Preparing for the Baby Food Safety Act 2021 and Closer to Zero” (March 22); attended FDA LFFM Grants Management webinar (March 22); and attended “Emerging Trends and Future Directions in Food Testing” (March 23).

MS. MEGHAN CAHILL, MRS. KITTY PRAPAYOTIN-RIVEROS, and MRS. TERRI ARSENAULT attended the Animal Feed Regulatory Program Standard (AFRPS) annual meeting in Wilmington, NC (March 14-17). The purpose of the meeting was to provide training and updates on topics of interest to laboratories and states regulatory bodies performing animal food sample collecting and/or testing who have achieved or are working to achieve ISO/IEC 17025:2017 accreditation or meet the AFRPS standard. DAC is accredited to ISO/IEC 17025:2017 and perform animal food analysis for toxins, and proximates, among other analytes under the auspices of the LFFM.



Mrs. Terri Arsenault (left), Ms. Meghan Cahill (right), at an AFRPS meeting event.



DR. KIRBY C. STAFFORD III participated in a meeting of the Tick-Borne Disease Working Group (28 attendees) (March 1, 22); presented a talk titled “Strategies and Challenges to Tick Management” at the International IPM Symposium in Denver, CO (25 attendees) (March 3); participated in a discussion with the presidents of CT Beekeepers Association, Eastern CT Beekeepers, and BackYard Beekeepers, concerning ways to increase registration among hobbyist beekeepers (March 24); and spoke on ticks and tick-borne disease to the Trillium Garden Club in Groton (32 attendees) (March 28).

MR. MARK H. CREIGHTON presented a comprehensive honey bee program at Marianapolis Preparatory School in Thompson (March 7-10). The program involved several lectures on honey bees, workshops on beehive construction, and a class on external anatomy dissection. The 23 students also discovered how to use a cell phone camera to take pictures through a dissection microscope lens and entered them into the school’s bridge week photo contest. The wooden bee boxes that were assembled were then donated to the Huneebee Project in New Haven. Presented a talk on “Straw Bale Gardening” to the Daytime Gardeners in North Haven (14 attendees) (March 22), who committed to starting a straw bale garden this year using the information provided; and coordinated a meeting here at CAES, with the Presidents of Connecticut’s three beekeeping clubs, the Apiary Inspector, State Entomologist, and Deputy State Entomologist (March 24). The goal of the meeting was to establish a working relationship and identify future joint projects to improve the health of honey bees statewide.

DR. MEGAN LINSKE participated in a call with members of the Annual Northeast Fish and Wildlife Agencies Conference 2022 planning committee as President and Workshop Chairperson of the Northeast Section of the Wildlife Society (TWS) (March 14); participated in a call with members of TWS Leadership Institute to prepare for the class of 2022 applications (March 17); gave an invited lecture titled “Tick Ecology: Host and Habitat Dynamics and Their Influence on Integrated Tick Management” at the Northeast Regional Center for Excellence in Vector-borne Diseases (NEVBD) Research and Training Seminar (March 21); participated in a networking call with TWS Diversity, Equity, and Inclusivity (DEI) committee as an active member (March 21); and participated in a conference call with members of CAES and Wilbur Cross High School to discuss the development of STEM girls mentoring program (March 28).

DR. GOUDARZ MOLAEI presented a joint talk titled “Emerging Ticks and Tick-borne Diseases in the Northeastern USA” with Dr. Eliza Little to the annual meeting of the Northeast Regional Center for Excellence in Vector-Borne Diseases (March 7); was interviewed on the most important tick species and the risk of human infection with tick-borne pathogens in the Northeast by Rich Kirby, Patch Media (March 31); and directed the CAES Tick Testing Laboratory; of the 254 submissions, blood-engorged adult blacklegged ticks were tested for Lyme disease, babesiosis, and anaplasmosis, and results were reported.

DR. GALE E. RIDGE published a revision of the “[Jumping Worms \(Megasclecidae: Pheretima\) in Connecticut](#)” fact sheet for the Station website (March 11); presented a talk on jumping worms to the Westport Garden Club (March 14); and repeated the same jumping worm talk at the New Haven Rotary Club luncheon (March 15).

DR. CLAIRE E. RUTLEDGE presented “Bronze Birch Borer in the American Context” in the online UK Forestry Scotland workshop “Bronze Birch Borer Risk” (March 2); presented “Update on Biological Control of Emerald Ash Borer” to the online Forest Health Workshop at The CAES (March 8); helped to administer the oral portion of the Arborist Licensing Exam (March 9); taught the insect proportion of the “Tree Conditions Laboratory” for Arboriculture 101, Connecticut Tree Protective Association, in Jones Auditorium (March 10); met via live-stream with 5th graders from Thomaston to consult on their project concerning ash in Connecticut (March 14); met via live-stream with members of the Bronze Birch Borer Risk Assessment task force in UK Forestry Scotland to discuss further details of Bronze Birch Borer Biology (March 11); attended via live-stream the Spring Meeting of the Connecticut Cooperative Agricultural Survey committee and provided an update on emerald ash borer monitoring and biological control, as well as on the status of southern pine beetle in Connecticut (March 22); and attended the annual meeting of the Northeastern Forest Pest Council in South Portland, ME (March 23-25).

DR. VICTORIA L. SMITH attended the Penn State University/Pennsylvania Dept. of Agriculture Spotted Lanternfly Summit (virtual) (March 1-3); organized and participated in the Forest Health Monitoring Workshop (March 8) (please see <https://portal.ct.gov/CAES/Publications/Publications/Forest-Health-Monitoring-Workshop-2022> for the recording of the Workshop); participated in a National Plant Board follow-up to the Spotted Lanternfly Summit (March 9); participated in the Spring meeting of the CT Cooperative Agricultural Pest Survey (CAPS) Committee (March 22); and participated in a discussion with the presidents of the Connecticut Beekeepers Association, Eastern Connecticut Beekeepers, and Backyard Beekeepers, concerning ways to increase registration among hobbyist beekeepers (March 24).

DR. KIMBERLY A. STONER participated in a national meeting of the Working Group on Managed Pollinated Protection, discussing pollinator protection for pesticide applicators working in areas like roadsides, rights-of-way, and lawns (35 attendees) (March 10).

MS. TRACY ZARRILLO participated in a virtual meeting with James Dorey and Marta Wells of Yale University, Katherine Urban-Mead of Xerces Society, Michael Ulyshen of US Forest Service Southern Research Station, James Hung Keng-Lou of University of Ohio, and James Rivers of Oregon State University to discuss a collaboration on a project that will examine wild bee populations in forest canopies (March 2); participated in a virtual meeting with the New England Bee Taxa Team, a subcommittee of the Northeast Fish and Wildlife Diversity Technical Committee, to discuss and finalize regional species of greatest conservation need and regional responsibility levels (March 3); loaned bee specimens to Jason Gibbs at the University of Manitoba to be used in a revision of the bee genus *Pseudopanurgus* (March 4); and participated in a virtual meeting with Bruce Young of NatureServe and Laura Saucier of CT DEEP to discuss collaboration on an upcoming grant titled “Support for Pollinator Conservation in the Northeast” in preparation for the State Wildlife Action Plan update in 2025 (March 9).



DR. JOSEPH PIGNATELLO met with Christopher Conners, Technology Commercialization Services, University of Connecticut, to discuss patent and licensing opportunities for an invention (March 3); gave a lecture titled “General Structure of the Proposal and Approaches to Writing It” for the Grants Writing Workshop of the CAES Post-Doctoral Association (approx. 25 attendees) (March 4); met with co-investigators from the University of Maryland and GeoSyntec Corp. on a SERDP grant (March 8); and met virtually with co-investigators from Villanova University, Pacific Northwest National Laboratory, and Oregon Health and Science University on a SERDP grant (March 11).

DR. PHILIP ARMSTRONG gave a lecture titled “What To Do If Your Grant Isn’t Funded” for the Grants Writing Workshop of the CAES Post-Doctoral Association (approx. 25 attendees) (March 4).

MS. ANGELA BRANSFIELD participated in a discussion forum for ABSA International members (March 2); participated in a CAES Health and Safety Committee meeting (March 11); participated virtually in Yale’s Biosafety Committee Meeting (March 17); and chaired a CAES DEI Committee Meeting (March 25).

MR. GREGORY BUGBEE served as a panelist on the Northeast Aquatic Nuisance Species Panel (February 4); participated as Past President at an Executive Committee meeting of the Northeast Aquatic Plant Management Society (February 23); and participated in the following events with **MS. SUMMER STEBBINS**: provided an update at the Connecticut River Hydrilla Stakeholders meeting (March 23); gave a seminar on Connecticut’s Invasive Aquatic Plant Problem at Three Rivers Community College (approx. 50 attendees) (March 23); gave a virtual seminar on Connecticut’s Invasive Aquatic Plant to a class of Master Gardeners (approx. 30 attendees) (March 24); and staffed the CAES table at Agriculture Day in the Hartford Armory (March 25).

DR. SARA NASON coached students from the Sound School in New Haven on science fair projects (March 2, 8); met virtually with Bryan Berger from the University of Virginia to discuss collaborative projects (March 3); was interviewed about PFAS phytoremediation research by Sinclair Broadcast Group (March 4); attended virtual meetings of the Benchmarking and Publications for Non-Targeted Analysis working group and subcommittees (March 10, 15, 22); gave a virtual talk entitled “Phytoremediation - A Plant-based Approach to Removing Pollutants, Case Study: Using Industrial Hemp to Extract Soil Pollutants” at the Cornell Cooperative Extension of Suffolk County 2022 Winter Webinar Series for Ornamental Horticulture (37 attendees) (March 10); met virtually with Dr. Yanna Liang from SUNY Albany to discuss potential collaborative PFAS research (March 11); presented virtually a seminar titled “Collaborative PFAS Research on High Resolution Mass Spectrometry Methods and Phytoremediation: Challenges and Progress” for the Wayne State University Department of Environmental Science and Geology (22 attendees) and met virtually with Dr. Zhijiang Lu to discuss common research interests and collaborations (March 23); and met virtually with Jane Philbrick and colleagues from Northeast Wool - The Bronx to discuss a potential phytoremediation project (March 25).

DR. ITAMAR SHABTAI participated in a virtual meeting with NRCS CT staff to discuss the Conservation Innovation Grant program (March 8); and met with a collaborator from the Slovak Academy of Sciences to discuss their role as Guest

Editors of a Special Issue of the journal *Minerals* (March 31).

DR. BLAIRE STEVEN met virtually with Dr. Hans Bernstein and members of his lab at the University of Tromso to discuss an application to the Research Council of Norway for a visiting researcher award (March 25).

DR. ZHENGYANG (PHILIP) WANG presented a virtual talk titled "Developing a New Remove-and-storage Technique for Rapid Arsenate Uptake in Residential Application Settings" at the American Chemical Society Meeting (approx. 30 on-site attendees) (March 20).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD participated in a Yankee SAF spring field meeting planning call (March 1); met with NRCS and RWA staff to discuss the impact of forest management on carbon dynamics (5 attendees) (March 2); met with Bryan Garcia and Ashley Stewart (Connecticut Green Bank) to discuss forest carbon dynamics and markets (March 7); spoke on the relationship of forest management on aboveground carbon storage and sequestration at the Forest Health Monitoring Workshop in New Haven (44 attendees) (March 8); met with Cassandra Speight (UConn) to discuss forest structure and Lyme disease risk (March 8); administered practical and oral examination to arborist candidates for the Connecticut Tree Protection Examining Board (March 9); participated in a (FEMC) Forest Ecosystem Monitoring Cooperative State Coordinators virtual meeting (March 10); met with regional foresters to discuss oak resiliency in Oakham, MA (7 attendees) (March 15); met with Mount Grace Land Conservation Trust staff in Warwick, MA to discuss forest regeneration (3 attendees) (March 16); participated in a meeting of Mountain Forest Trustees (March 19); was interviewed about growing forsythias and whether they are listed as invasive by Robert Miller of the News-Times (March 23).

DR. SUSANNA KERIÖ presented a talk titled "Sweet Dreams - Carbohydrates and Stress in Urban Trees" in the Forest Health Monitoring Workshop (42 participants) (March 8); assisted the administration of the arborist exam (March 9); and participated in a CT Urban Forestry Council meeting (March 24).

DR. LEIGH WHITTINGHILL met virtually with Jacqueline Kowalski, UConn Extension Educator in Urban Agriculture, to discuss potential collaboration on her Specialty Crop Block Grant application and other upcoming issues (March 3); attended two follow-up virtual meetings with Jane Philbrick and Kip Bergstrom from Northeast Wool and **DRS. JASON WHITE, SARA NASON, and NUBIA ZUVERZAMENA** to discuss the Bridgeport brownfield projects (March 3, 25); met virtually with farm managers for Yale Farm, Gather New Haven, and Common Ground to discuss the record-keeping system for the upcoming monitoring project (March 10); met with Alyssa Grant from City Seed to discuss how they can assist with farmer recruitment for her Specialty Crop Block Grant project should it get funded (March 14); attended the quarterly meeting for the Connecticut Council for Soil and Water Conservation and gave them an update on CAES activities (March 17); met virtually with Patrick Doyle of Knox to discuss the Specialty Crop Block Grant Project and other updates (March 18); attended a virtual meeting with CAES representatives and Ivalise Velazquez and Kimberly Barrington at Wilbur Cross to discuss the Mentoring Girls in STEM partnership (March 28); helped to organize and host the second Department of Agriculture Urban Agriculture Webi-

nar on the topic of grant writing (March 30); and met with Jeremy Oldham at Yale Farm for the first farm visit of Dr. Whittinghill's farm monitoring pilot project (March 31).

DR. SCOTT C. WILLIAMS attended The CAES Post-Doctoral Association meeting on grant writing and presented about making your proposal relevant (March 4); participated in the 2022 virtual annual meeting of the Northeast Center for Excellence in Vector-Borne Diseases (March 7-8); attended the virtual meeting of The CAES Annual Forest Health Monitoring Workshop (March 8); attended the virtual spring graduate committee meeting for Cornell University Master's student Joseph Poggi (March 9); attended the virtual research and training seminar of the Northeast Center for Excellence in Vector-Borne Diseases (March 21); participated in a Zoom call with Chris Przbyszewski, Executive Vice President, US Biologic, about future research opportunities (March 23).

MR. JOSEPH P. BARSKY attended the virtual meeting of The CAES Annual Forest Health Monitoring Workshop (March 8); participated in the formal review of the Agricultural Science and Technology Education Program at Rockville High School (March 10); met with individuals from the Mt. Grace Land and Conservation Trust to discuss a collaborative research project on slash walls to protect forest regeneration from browsing by overabundant deer (5 attendees) (March 16); participated in an Executive Committee meeting of the New England Society of American Foresters in Portland, ME (March 22); presented a research poster titled "Connecticut Oak Mast Surveillance Program" at the 102nd NESAF Annual Winter Meeting (415 attendees) (March 23); and was elected to serve as New England Society of American Foresters Silvicultural Working Group Chair (March 24).

PLANT PATHOLOGY AND ECOLOGY

DR. YONGHAO LI presented "2021 Tree Disease Highlights" at the Forest Health Monitoring Workshop via Zoom (54 adults) (March 8); participated in the National Plant Diagnostic Network Online Communication & Web Portal Committee meeting via Zoom (6 adults) (March 9); instructed "Tree Diseases" in the Hand-on Night for the Connecticut Tree Protective Association Arboriculture 101 Course in Jones Auditorium (36 adults) (March 10); attended the National Plant Diagnostic Network Seed Pathogen Testing Workshop via Zoom (March 17); and was interviewed about "Prospective Role Model in the Industry" by Ms. Christa Lessing at the University of Vermont via Zoom (March 18).

DR. WASHINGTON DA SILVA presented three seminars showcasing his virology research program at CAES: 1) a Zoom seminar at the first conference on plant protection and diagnose of plant pathogens affecting important crops in Brazil titled "Interference RNA (RNAi): A New Perspective on Plant Disease Management" (160 adults) (February 15); 2) a seminar at the Universidade Federal do Rio Grande do Norte (UFRN) in Natal, Rio Grande do Norte state, Brazil titled "Nano-enabled Technologies: Prospective Weapons to Tackle Destructive Plant Viruses" (20 adults in person, 60 adults via Zoom) (February 22); 3) a seminar at the Universidade Federal Rural do Semiárido (UFERSA), located in the city of Mossoró, Rio Grande do Norte state, Brazil titled "Nanotechnology: an arsenal of options in the control of phytoviruses and other plant pathogens" (20 adults in person, 100 adults via Zoom) (March 7). Dr. da Silva was invited to visit two universities in the Northeast of Brazil, UFRN and UFERSA, to meet with faculty

members, students, and local growers of melon and papaya. During his visit, Dr. da Silva discussed potential collaborations with local universities and agro-industries and the prospect of bringing students from those universities to spend a year in the da Silva Lab at The CAES to be trained in molecular virology techniques (February 19-March 10).



Dr. da Silva meeting with faculty members of UFERSA and UFRN during his visit.



Dr. da Silva meeting with growers of melon and papaya from the northeast of Brazil during his visit.



DRS. MOHAMMED-AMINE HASSANI and ZANNATUL FERDOUS of The CAES Post-doctoral Association organized a Scientific grant writing workshop with featured speakers **DRS. JASON WHITE, QUAN ZENG, PHILIP ARMSTRONG, LINDSAY TRIPPLETT, JOSEPH PIGNATELLO, and SCOTT WILLIAMS** (25 adults) (March 4).

DR. ROBERT MARRA presented three lectures on mycology and forest pathology for the Yale Forest School M.S. program (12 adults) (March 7, 9, 14); presented a “Beech Leaf Disease Update” at the Forest Health Monitoring Workshop via Zoom (54 adults) (March 8); and presented a “Beech Leaf Disease Update” for the CT CAPS Committee Meeting via Zoom (20 adults) (March 22).

DR. WADE ELMER presented a talk titled “Earthworms and Soil Health” to the Branford Land Trust in Branford (16 attendees) (March 8).

DR. QUAN ZENG presented “Entry Points of Fire Blight Pathogen *Erwinia amylovora* on Apple Shoots” at the Northeastern IPM center seminar (34 adults) (March 24); gave a guest lecture titled “Apple Production, Diseases and Pests” to



Dr. Quan Zeng giving a lecture to students at China Agricultural University via Zoom.

graduate and undergraduate students at the China Agricultural University via Zoom (24 adults) (March 25).

MS. ROSE HISKES conducted a Connecticut Invasive Plant Working Group (CIPWG) Symposium planning committee meeting via Zoom (16 attendees) (March 3); participated in a meeting with Mr. Peter Hearn, Council on Environmental Quality, along with Ms. Victoria Wallace and Mr. Emmett Varrichio, CIPWG Co-chairs regarding information on CIPWG for the report “‘Invasives’: Previously Described and Newly Arrived” (March 7); gave a talk titled “Earthworms, Soil Health and Jumping Worms,” to the Canton Garden Club at the Canton Community Center in Canton (27 attendees) (March 8); with **DR. YONGHAO LI**, instructed “Tree Diseases” in the Hands-on Night for the Connecticut Tree Protective Association Arboriculture 101 Course in Jones (36 adults) (March 10); notified the CAPS Committee regarding the new insect find, *Paracorsia repandalis*, a caterpillar pest of mullein (20 adults) (March 22); met with Ms. Elisabeth Tonkin of Seabury Life Plan Community regarding holding a CIPWG Walk and Talk on the property in May (March 25); participated in an invasive plant pulling party at Spicebush Swamp Park in West Hartford (March 26).

VALLEY LABORATORY

DR. CAROLE CHEAH was interviewed on the effects of winter 2022 on hemlock woolly adelgid (HWA) survival by Bob Miller of the News-Times (February 8); gave a talk, via Zoom, on collaborations in biological control of HWA at the Forest Health Monitoring Workshop (March 8); gave an evening presentation on the biology, threat, and resurgence of HWA and expanding biological control of HWA on land trust properties to Flanders Land Trust (17 attendees) (March 24).

DR. RICHARD COWLES presented “Neonics and Their Alternatives” to the Northeast Regional Pesticide Education Safety Conference via Zoom (30 participants) (March 1); presented “Update on Projects Supported by the Christmas Tree Promotion Board” for the Connecticut Christmas Tree Growers Association (60 par-

ticipants) (March 5); and discussed “Climate Weirdness: Implications for Insect and Disease Outbreaks” at ArborEXPO, West Springfield, MA (120 participants) (March 31).

DR. JAMES LAMONDIA participated in Agriculture Day at the Capitol, speaking about the 2021 Century Farm Award recognizing March Farms (100 people) (March 25); and spoke about “The History of Tobacco in Connecticut” at the Enfield Public Library (50 attendees) (March 29).

DEPARTMENTAL RESEARCH UPDATES MARCH 2022

ADMINISTRATION

1. Magaña-López, E., Palos-Barba, V., Zuverza-Mena, N., Vázquez-Hernández, M. C., White, J. C., Nava-Mendoza, R., Feregrino-Pérez, A. A., Torres-Pacheco, I., Guevara-González, R. G. (2021). Nanostructured mesoporous silica materials induce hormesis on chili pepper (*Capsicum annuum* L.) under greenhouse conditions. *Heliyon*. <https://doi.org/10.1016/j.heliyon.2022.e09049>

Abstract: Current agricultural practices for vegetable production are unsustainable, and the use of certain nanomaterials has shown significant potential for either plant growth promotion or defense induction in crop species. The aim of the present work was to evaluate the possible effects of two SBA nano-structured silica materials differing in morphology; SBA-15, with porous structure in parallel and with a highly ordered hexagonal array and SBA-16, with spheric nano-cages located in cubic arrays, as plant growth promoters/eustressors on chili pepper (*Capsicum annuum* L.) during cultivation under greenhouse conditions. The study was carried out at three foliarly applied concentrations (20, 50 and 100 ppm) of either SBA materials to determine effects on seed germination, seedling growth, plant performance and cold tolerance under greenhouse. Phytotoxicity tests were carried out using higher concentrations (100, 1000 and 200 ppm) applied by dipping or spraying onto chili pepper plants. Deionized water controls were included. The results showed that the SBA materials did not affect seed germination; however, SBA-15 at 50 ppm and 100 ppm applied by imbibition significantly increased seedling height (up to 8-fold) and provided enhanced growth performance in comparison with controls under select treatment regimes. Weekly application of SBA-15 at 20 ppm significantly increased stem diameter and cold tolerance; however, SBA-16 showed significant decreases in plant height (20 ppm biweekly applied) and stem diameter (20, 50 and 100 ppm biweekly applied). The results demonstrate that both SBA materials provided hormetic effects in a dose dependent manner on chili pepper production and protection to cold stress. No phytotoxic response was evident. These findings suggested the nanostructured mesoporous silica have potential as a sustainable amendment strategy to increase crop production under stress-inducing cultivation conditions.

2. Teng, M., Zhao, X., Wu, F., Wang, C., Wang, C., White, J. C., Zhao, W., Zhou, L., Yan, S., Tian, S., (2022). Charge-specific adverse effects of polystyrene nanoplastics on zebrafish (*Danio rerio*) development and behavior. *Environ. Int.* 163. <https://doi.org/10.1016/j.envint.2022.107154>

Abstract: Nanoplastics are being detected with increasing frequency in aquatic environments. Although evidence suggests that nanoplastics can cause overt tox-

icity to biota across different trophic levels, but there is little understanding of how materials such as differently charged polystyrene nanoplastics (PS-NP) impact fish development and behavior. Following exposure to amino (positive charge) PS-NP, fluorescence accumulation was observed in the zebrafish brain and gastrointestinal tract. Positively charged PS-NP induced stronger developmental toxicity (decreased spontaneous movements, heartbeat, hatching rate, and length) and cell apoptosis in the brain and induced greater neurobehavioral impairment as compared to carboxyl-modified (negative charge) PS-NP. These findings correlated well with fluorescence differences indicating PS-NP presence. Targeted neuro-metabolite analysis by UHPLC-MS/MS reveals that differentially charged PS-NP disturbed important biological pathways. Positively charged PS-NP interacted with the neurotransmitter receptor NMDA2B, whereas negatively charge PS-NP impacted the GPR1 receptor, each with different binding energies that led to behavioral differences. These findings reveal the charge-specific toxicity of nanoplastics to fish and provide new perspective for understanding PS-NP neurotoxicity that is needed to accurately assess potential environmental and health risks of these emerging contaminants.

ENTOMOLOGY:

1. “Anomalous Morphologies in *Ixodes scapularis* Feeding on Human Hosts” Noelle Khalil, Katherine Dugas, Jamie Cantoni, Kirby C. Stafford III, and Goudarz Molaei. Submitted to *Ticks and Tick-borne Diseases* on March 14, 2022.

ENVIRONMENTAL SCIENCES

1. Sigmund, G., Arp, H. P. H., Aumeier, B. M., Bucheli, T. D., Chefetz, B., Chen, W., Droge, S. T. J., Endo, S., Escher, B. I., Hale, S. E., Hofmann, T., Pignatello, J., Reemtsma, T., Schmidt, T. C., Schönsee, C. D., Scheringer, M. (2022). Sorption and mobility of charged organic compounds: How to confront and overcome limitations in their assessment. *Environ. Sci. Technol.* 56(8). <https://doi.org/10.1021/acs.est.2c00570>

Abstract: Permanently charged and ionizable organic compounds (IOC) are a large and diverse group of compounds belonging to many contaminant classes, including pharmaceuticals, pesticides, per- and polyfluoroalkyl substances and natural toxins. Sorption and mobility of IOCs are distinctively different from those of neutral compounds. Existing concepts for describing organic contaminant sorption, and by extension mobility, are inadequate for IOC. Predictive models developed for neutral compounds are based on octanol-water partitioning of compounds (K_{OW}) and organic-carbon content of soil/sediment, which is used to normalize sorption measurements (K_{OC}). We revisit those concepts and their translation to IOC (D_{OW} and D_{OC}) and discuss compound and soil properties determining sorption of IOC under water saturated conditions. Highlighting possible complementary and/or alternative approaches to better assess IOC mobility, we discuss implications on their regulation and risk assessment. The development of better models for IOC mobility needs consistent and reliable sorption measurements at well-defined chemical conditions in natural porewater, better IOC-, as well as sorbent characterization. Such models should be complemented by monitoring data from the natural environment. The state of knowledge presented here may guide urgently needed future investigations in this field for researchers, engineers, and regulators.

2. Gloria-Soria, A., Brackney, D. E., Armstrong P. M. (2022). Saliva collection via capillary method may underestimate arboviral transmission by mosquitoes. *Parasites and Vectors*, 15(1), 103. <https://doi.org/10.1186/s13071-022-05198-7>

Abstract: Arthropod-borne viruses (arboviruses) impose a major health and economic burden on human populations globally, with mosquitoes serving as important vectors. Measuring the ability of a mosquito population to transmit an arbovirus is important in terms of evaluating its public health risk. In the laboratory, a variety of methods are used to estimate arboviral transmission by mosquitoes, including indirect methods involving viral detection from mosquito saliva collected by forced salivation. The accuracy of indirect methods to estimate arbovirus transmission to live animal hosts has not been fully evaluated. We compared three commonly used proxies of arboviral transmission, namely, the presence of virus in mosquito legs, in salivary glands (SG) and in saliva collected in capillary tubes using forced salivation, with direct transmission estimates from mosquitoes to suckling mice. We analyzed five vector-virus combinations, including *Aedes aegypti* infected with chikungunya virus, West Nile virus and Zika virus; *Culex quinquefasciatus* infected with West Nile virus; and *Aedes triseriatus* infected with La Crosse virus. Comparatively, the methods of detecting virus infection in mosquito legs and in SG were equally accurate in predicting transmission. Overall, the presence of virus in mosquito legs was a more accurate predictor of transmission than the commonly implemented viral detection method using forced salivation into a capillary tube, and was subject to less technical variation. These results suggest that, in general, forced salivation methods tend to underestimate virus transmission, and they provide confidence in the use of mosquito leg screens to evaluate the transmission potential of a mosquito population.

PLANT PATHOLOGY AND ECOLOGY:

1. Raudales, R. E., Pundt, L., Li, Y. (2022). Bacterial blight on geraniums, again. *e-Gro Alert*, 11(19), 1-3. <http://www.e-gro.org/pdf/2020-11-19.pdf>
2. He, F., Yang, J., Zhao, Y., Laborda, P., Jia, Y., Safdar, A., Kange, A. M., Li, B., Zhou, L., Zeng, Q., Brown, S., Fu, Z. Q., Liu, F. (2022). Identification and characterization of a stem canker and twig dieback disease of pear caused by *Neofusicoccum parvum* in Chinese mainland. *Phytopathology Research*, 4(6), 1-11.

Abstract: Pear (*Pyrus* spp.) is one of the most consumed fruits in China, but the pear production has to confront the growing threat from fatal diseases. In this study, we report two incidences of stem canker and twig dieback disease on pear plants, which led to death of pear seedlings (approximately 10% of total plants) in Guangxi and Jiangsu provinces. Using a combination of morphological and molecular diagnoses, along with pathogenicity test, the causal agent of the disease in these two locations was identified to be the fungus *Neofusicoccum parvum*. However, the isolates were divided into two clades: CY-2 isolate and other four isolates including ZL-4, BM-9, BM-10 and BM-12 might split into two groups of *N. parvum*. Two representative isolates (CY-2 and ZL-4) were selected for further investigation. We observed that the optimal temperature for in vitro infection on pear trees of these two isolates was at round 25°C. Both CY-2 and ZL-4 could infect different sand pear varieties and other horticultural plants in

vitro, while CY-2 had a higher virulence on several pear varieties including Nanyue, Lvyun, Qiushui and Ningmenghuang. Furthermore, the efficacy of fungicides against these two isolates was evaluated, and carbendazim and flusilazole were found to be the most effective fungicides in inhibiting the growth of these fungal pathogens. Taken together, these findings redefine the *N. parvum* species and provide potential strategies for the future management of this disease.

VALLEY LABORATORY:

1. Kodati, S., Gambhir, N., Yuen, G., Adesemoye, A. O., Everhart, S. (2022). Diversity and aggressiveness of *Rhizoctonia* spp. from Nebraska on soybean and cross-pathogenicity to corn and wheat. *Plant Disease*. <https://doi.org/10.1094/PDIS-04-21-0872-RE>

Abstract: *Rhizoctonia* and *Rhizoctonia*-like species of fungi that cause disease are known to have varying host ranges and aggressiveness. Accurate identification of these species causing disease is important for soybean disease management that relies upon crop rotation. The anamorphic genus *Rhizoctonia* contains several diverse species and anastomosis groups (AG) including some known soybean pathogens, such as *R. solani*, while for others the ability to cause disease on soybean has not been well described. The present study was conducted to identify the predominant species and AG of *Rhizoctonia* from soybean, corn, and wheat fields that are pathogenic on soybean, and characterize cross-pathogenicity to common rotational crops, corn and wheat. We surveyed for *Rhizoctonia* spp. in Nebraska and isolates were identified to species and AG, and aggressiveness assessed. A total of 59 *R. zae* isolates, 49 *R. solani*, nine binucleate *Rhizoctonia*, three *R. circinata*, and two *R. oryzae* isolates were collected in 2016 and 2017 from a total of 29 fields in 15 counties. The most abundant *R. solani* AGs were: AG-4, AG-1 IB, AG-2-1, AG-3, and AG-5. *Rhizoctonia solani* AG-4 and *R. zae* were found in all three regions of the state (west, central, and eastern). Some isolates that were most aggressive to soybean seedlings were cross-pathogenic on wheat and corn too. In addition, *R. zae* was pathogenic on soybean when evaluated at 25 °C, which is a warmer than temperatures used previously, and isolates were identified that were aggressive on soybean and cross-pathogenic on both corn and wheat.

JOURNAL ARTICLES APPROVED MARCH 2022

Dumas, M., Borges, D. F., Preising, S., Tippett, E., Ambrósio, M. M. Q., da Silva, W. L. Gathered from the vine: Survey of seven grapevine viruses within New England vineyards. *Plant Disease*.

Gloria-Soria, A. Special collection: Highlights of medical, urban and veterinary entomology. Highlights in medical entomology, 2021. *Journal of Medical Entomology*.

Hanna, E., Lopez, O., Salinas, F., Astete, C., Tamez, C., Wang, Y., Wu, H., Eitzer, B., Elmer, W., Louie, S., White, J. C., Sabliov, C. Biodegradable zein nanoparticles for controlled release and enhanced translocation of pesticide in soybean (*Glycine max*). *ACS Agricultural Science and Technology*.

Hou, J., Hu, C., Wang, Y., Yang, K., White, J. C., Lin, D. Soil dissolved organic matter alleviates the pH-dependent contact toxicity of nTiO₂ to nematodes by modulating nano-bio interfacial interactions. *Journal of Hazardous Materials*.

Keriö, S. Urban tree research at the Connecticut Agricultural Experiment Station. *Experiment Station Associates - E-Blast*.

Kodati, S., Cowles, R. S., LaMondia, J. A. Survival of conidia of the boxwood blight pathogen *Calonectria pseudonaviculata* under different relative humidity conditions. *Phytopathology* (abstract).

LaMondia, J. A. Integrated research results into a boxwood blight management program. *Phytopathology* (abstract).

Molaei, G., Andreadis, T. The Connecticut Center for Vector Biology & Zoonotic Diseases: A long history of research partnership and outreach in public health entomology. *Wing Beats*.

Poudel, P., Whittinghill, L., Kobayashi, H., Lucas, S. Evaluating the effects of *Bacillus subtilis* treatment and planting depth on saffron (*Crocus sativus* L.) production in a green roof system. *HortScience*.

Wang, Y., Borgatta, J., White, J. C. Novel food coatings as a sustainable strategy for food safety and security. *Nature Food*.

Whittinghill, L., Ballard, M., Chaudhary, A., Kandel, S., Mullins, C., Poudel, P. Runoff water quality from different urban agricultural systems using common nutrient management practices. *HortScience*.

Zhang, P., Zhang, Z., White, J. C., Lynch, I. Nano-enabled agrochemicals: Emerging contaminants or opportunities for agriculture? *Environmental Pollution*.



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